

CBN 工具

长寿命化

稳定化

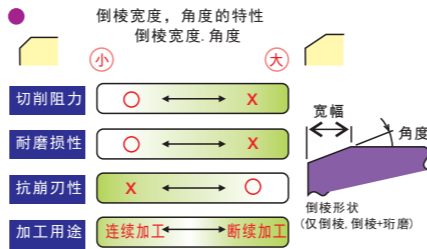
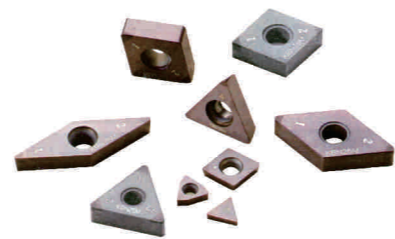
高速化

型号的查看方法 (车削用刀片)

C N G A 12 04 04 S01225 ME

车削用刀的表示方法 B2参考

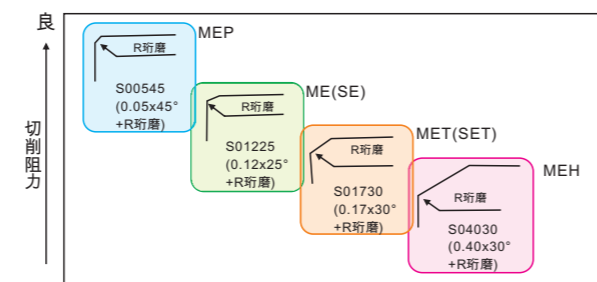
| 刀片类型 | 型号例 | 刀尖式样 | 任意符号 | 切刃长度 | 使用刀尖数 | 再研磨 |
|------|---------------------|--------|--------------|--------|-------|-----|
| 负角 | CNGA120404MEF | F | MEF | 短(小刀尖) | 2 | 不推荐 |
| | CNGA120404S01225ME | S01225 | ME | | 2 | |
| | CNGA120404S00545MEP | S00545 | MEP | | 2 | |
| | CNGA120404S1225SE | S01225 | SE | | 1 | |
| | CNMN120404S02020 | S02020 | 无符号(仅CBN900) | | 复数刀尖 | |
| 正角 | CCMW09T304MEF | F | MEF | 短(小刀尖) | 2 | 不推荐 |
| | CCMW09T304T00815ME | T00815 | ME | | 2 | |
| | CCMW09T304S01225MES | S01225 | MES | | 2 | |
| | CCMW09T304T00815SE | T00815 | SE | | 1 | |



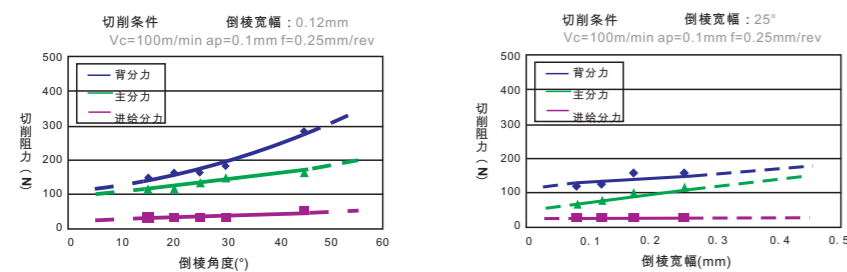
刀尖式样的查看方法

| 符号 | 刀尖状态 | 刀尖式样 | 形状例 |
|----|-------|--------|--------------------|
| F | 锋利刀尖 | F | 锋利刀尖 |
| E | R 研磨 | E008 | R0.08mm 研磨 |
| T | 倒棱 | T01215 | 0.12mm X 15° 倒棱 |
| S | 倒棱+研磨 | S01225 | 0.12mm X 25° 倒棱+研磨 |

① 负角刀片 标准刀尖式样 (高硬度材料加工)

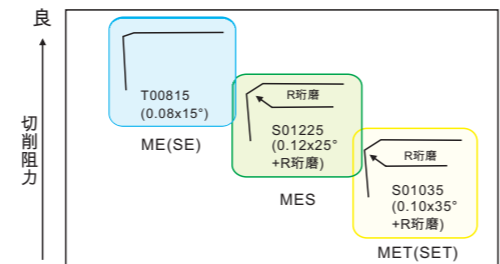


● 切削阻力与倒棱角度, 宽幅的关系



对切削阻力的影响, 倒棱角度要大于倒棱宽度。倒棱角度变大对抗崩刃性的改善效果大于改变倒棱宽度, 但与此同时切削阻力也会增加, 请注意。

② 正角刀片 标准刀尖式样 (高硬度材料加工)



CBN推荐切削条件 CBN Recommended Cutting Conditions

| 被加工材料 Material to be processed | 被加工材料 Material to be processed 硬度 Hardness | 加工形态 Processing form | | 推荐材质 Recommended material | 切削条件 Cutting conditions | | |
|-----------------------------------|--|-------------------------|----------|------------------------------|-------------------------|----------------|------------------|
| | | 通用精加工 | 连续 ~ 断续 | | 切削速度Vc (m/min) | 切深ap (mm) | 进给量f (mm/rev) |
| 淬硬钢 | 55HRC以上 | 通用精加工 | 连续 ~ 断续 | CBN05M | 100-150-200 | 0.05-0.3-0.5 | 0.05-0.08-0.1 |
| | | 高效稳加工 | 轻断续 ~ 断续 | CBN25M | 80-120-160 | 0.05-0.3-0.5 | 0.05-0.08-0.1 |
| | | 断续 (小切深) | 断续 ~ 强断续 | CBN35M | 60-100-150 | 0.05-0.2-0.4 | 0.05-0.08-0.1 |
| | | 重切削 | 连续 ~ 断续 | CBN900 | 70-90-110 | 0.5-1.0-2.0 | 0.05-0.1-0.2 |
| 灰口铸铁 | 250HB以下 | 精加工 | 连续 ~ 轻断续 | CBN60M | 300-600-800 | 0.05-0.2-0.5 | 0.03-0.05-0.1 |
| | | 高效精加工 | 连续 ~ 轻断续 | CBN900 | 500-900-1200 | 0.1-0.5-1.0 | 0.05-0.1-0.2 |
| | | 重切削 | 连续 ~ 断续 | CBN900 | 500-700-900 | 0.5-1.5-3.0 | 0.1-0.3-0.5 |
| 轧辊材料 (冷硬铸铁) | 55HRC以上 | 精加工 | 连续 ~ 断续 | CBN25M | 80-120-160 | 0.05-0.3-0.5 | 0.05-0.08-0.1 |
| | | 重切削 | 连续 ~ 断续 | CBN900 | 70-90-110 | 0.3-0.7-1.0 | 0.05-0.1-0.15 |
| 铁系烧结金属 | - | 精加工 | 连续 ~ 轻断续 | CBN570 | 50-150-250 | 0.05-0.15-0.25 | 0.03-0.1-0.2 |
| | - | 精加工 | 连续 ~ 断续 | CBN70M | 100-200-250 | 0.05-0.2-0.3 | 0.05-0.15-0.25 |

PCD刀具推荐切削条件 (车削) Recommended cutting conditions for PCD tools (turning) ★ 第1推荐 ☆ 第2推荐

| 被加工材料 Material to be processed | 刀片材质 | | 切削条件 | | | 备注 | |
|-----------------------------------|--------|--------|-----------------|---------------|------|----------|-----------------|
| | PCD001 | PCD010 | 切削速度 (m/min) | 切深 (mm) | | | 进给量 (mm/rev) |
| | | | | 小刀尖以及 正角刀片 | 负角刀片 | | |
| 铝合金、锌合金 | ★ | ☆ | 300~1500 | ~1.0 | ~2.0 | 0.03~0.5 | 干式 湿式 均可 |
| 铜、黄铜、青铜 | ★ | ☆ | 300~1000 | ~1.0 | ~2.0 | 0.03~0.5 | |
| 镁合金 | ★ | ☆ | 400~1200 | ~1.0 | ~2.0 | 0.03~0.5 | |
| 硬质合金 | ★ | ☆ | 10~30 | ~0.3 | ~0.3 | 0.03~0.1 | 湿式 |
| 钛合金 | ★ | ☆ | 100~200 | ~1.0 | ~2.0 | 0.05~0.2 | |
| 玻璃纤维增强塑料碳纤维 | ★ | ☆ | 100~600 | ~1.0 | ~2.0 | 0.05~0.5 | 干式 |
| 硅填充塑料硬质纤维板 | ★ | ☆ | 400~800 | ~1.0 | ~2.0 | 0.05~0.5 | |

小孔螺纹刀 推荐切削条件 Small Hole Thread Cutter Recommended Cutting Conditions

◆ 推荐切削条件 Recommended cutting conditions ★: 第一推荐

| 被加工材料 Material to be processed | 推荐刀片材质 (切削速度 m/min) |
|-----------------------------------|------------------------|
| | MEGACOAT ZM860 |
| 碳钢/合金钢 | ★ 30~100 |
| 不锈钢 | ★ 30~80 |
| 铝/有色金属 | - |

(注意)
1) 标准切削速度为30~50m/min。小内径和高转速时,进刀量会有无法跟上要求的情况。需注意。
2) 推荐湿式加工。

◆ 切深和走刀数 (公制螺纹) Depth Of Cut And Number Of Passes (metric Thread)

| 螺距 (mm) | 总切深 (mm) | 走刀数 (回) | 1次走刀 | 2次走刀 | 3次走刀 | 4次走刀 | 5次走刀 | 6次走刀 | 7次走刀 | 8次走刀 | 9次走刀 | 10次走刀 | 11次走刀 | 12次走刀 | 13次走刀 | 14次走刀 | 15次走刀 | 16次走刀 | 17次走刀 | 18次走刀 | 19次走刀 | 20次走刀 |
|---------|----------|---------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0.5 | 0.3 | 9 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 | 0.02 | | | | | | | | | | | | |
| 0.7 | 0.42 | 10 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.02 | | | | | | | | | | |
| 0.75 | 0.45 | 10 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | | | | | | | | | | |
| 0.8 | 0.48 | 11 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | | | | | | | | | |
| 1.00 | 0.61 | 12 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | | | | | | | | |
| 1.25 | 0.77 | 14 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | | | | | | |
| 1.50 | 0.93 | 17 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | | | | |
| 1.75 | 1.1 | 20 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | |

◆ 切深和走刀数 (惠氏螺纹) Cutting Depth And Number Of Passes (wyeth Thread)

| 牙数 (牙/英寸) | 总切深 (mm) | 走刀数 (回) | 1次走刀 | 2次走刀 | 3次走刀 | 4次走刀 | 5次走刀 | 6次走刀 | 7次走刀 | 8次走刀 | 9次走刀 | 10次走刀 | 11次走刀 | 12次走刀 | 13次走刀 | 14次走刀 | 15次走刀 | 16次走刀 | 17次走刀 | |
|-----------|----------|---------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| 24 | 0.65 | 13 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | | | | | |
| 20 | 0.81 | 15 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | | | |
| 18 | 0.91 | 17 | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 |

◆ 切深和走刀数 (英制螺纹) Depth Of Cut And Number Of Passes (inch Thread)

| 牙数 (牙/英寸) | 总切深 (mm) | 走刀数 (回) | 1次走刀 | 2次走刀 | 3次走刀 | 4次走刀 | 5次走刀 | 6次走刀 | 7次走刀 | 8次走刀 | 9次走刀 | 10次走刀 | 11次走刀 | 12次走刀 | 13次走刀 | 14次走刀 | 15次走刀 | 16次走刀 | 17次走刀 | 18次走刀 |
|-----------|----------|---------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 36 | 0.44 | 10 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.03 | 0.02 | 0.02 | | | | | | | | |
| 32 | 0.5 | 11 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | | | | | | | |
| 28 | 0.55 | 12 | 0.07 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | | | | | | | |
| 24 | 0.65 | 12 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | 0.03 | | | | | | | |
| 20 | 0.78 | 14 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | | | | |
| 18 | 0.88 | 17 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 |
| 16 | 0.99 | 18 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 |

CBN
PCD
立装螺纹
切槽加工
通用螺纹
钻孔
通用铣削
铣削对策
钻铣加工
粗铣加工
T型槽加工
直角台肩
快进给铣刀
圆鼻铣刀
球刀

技术资料

60°.55° (无修光刃) 60°.55° (no wiper) 公制螺纹/英制螺纹 Metric thread / inch thread (切深表示半径切深的值)

Table with columns for Kind, Model, Tip angle, Total depth, Flute count, and 19 parameters (1-19) for various thread types and models.

60°.55° (无修光刃) 60°.55° (no wiper) 英制螺纹/惠氏螺纹/管用平行螺纹/锥度管螺纹 Inch thread / Wyeth thread / tube parallel thread. Taper pipe thread (切深表示半径切深的值)

Table with columns for Kind, Model, Tip angle, Total depth, Flute count, and 19 parameters (1-19) for various thread types and models.

- CBN
PCD
立装螺纹
切槽加工
通用螺纹
钻孔
通用铣削
铣削对策
钻铣加工
粗铣加工
T型槽加工
直角台肩
快进给铣刀
圆鼻铣刀
球刀

技术资料

- CBN
PCD
立装螺纹
切槽加工
通用螺纹
钻孔
通用铣削
铣削对策
钻铣加工
粗铣加工
T型槽加工
直角台肩
快进给铣刀
圆鼻铣刀
球刀

技术资料

舍弃式快速钻头技术信息

Discard-style fast-Bit Technical Information

切削速度 (Vc)

$V_c = \frac{D_c \times n \times \pi}{1000}$

Vc(m/min): 切削速度
Dc(mm): 钻头直径
n(rev/min): 转速

实例
主轴转速为1600rev/min, 钻头直径为Φ20mm, 其切削速度为:
 $V_c = \frac{D_c \times n \times \pi}{1000} = \frac{20 \times 1600 \times \pi}{1000} = 100 (m/min)$

进给速度

$V_f = f_r \times n$

Vf(mm/min): 进给速度
Fr(mm/rev): 每转进给量
n(rev/min): 主轴转速

实例
主轴转速为1500rev/min, 每转进给量为0.1mm/rev, 其进给速度为:
 $V_f = f_r \times n = 0.1 \times 1500 = 150 (mm/min)$

孔加工时间

$T_c = \frac{L_d \times i}{n \times f}$

Tc(min): 加工时间
Ld(mm): 钻孔深
Fr(mm/rev): 每转进给量
i: 孔数量
n(rev/min): 主轴转速

实例
钻一个直径为Φ20mm, 深为40mm的孔, 切削速度为100m/min, 每转进给量为0.1mm/rev, 求钻孔时间。
 $n = \frac{V_c \times 1000}{D_c \times \pi} = \frac{100 \times 1000}{20 \times 3.14} = 1600 (rev/min)$
 $T_c = \frac{L_d \times i}{n \times f} = \frac{40 \times 1}{1600 \times 0.1} = 0.25 (min)$

金属去除率

$Q = \frac{V_f \times \pi \times D_c^2}{4 \times 1000}$

Q(cm³/min): 金属去除率
Dc(mm): 钻头直径
Vf(mm/min): 进给速度

实例
一个直径为Φ20mm的钻头, 加工时的进给速度为160mm/rev, 其金属去除率为:
 $Q = \frac{V_f \times \pi \times D_c^2}{4 \times 1000} = \frac{160 \times 3.14 \times 20^2}{4 \times 1000} = 50.24 (cm³/min)$

快速钻加工相关参数计算方法

Related to the processing parameters of shallow hole drilling method of calculation

钻头的钻入 钻头的钻入是钻削成功的重要因素。保证良好的孔质量的方法之一是保证工件的钻入表面与钻头的中心轴垂直。此外,可转位浅孔钻还可以通过调整进给,来加工凸的、凹的、倾斜的和不规则的钻入表面。
Drill drill into Drill drill into is an important factor in the success of drilling. To ensure good quality of the hole one of the ways is to ensure that the workpiece surface and drill drill into the center of the vertical axis. In addition, indexable drill shallow holes can also adjust the feed, to process convex, concave, and sloping and irregular drill into the surface.

| 加工表面情况 Surface conditions | 应对措施 Response |
|------------------------------|--|
| | 对于凸的表面,其加工条件相对较好,并且钻心能理想地首先与工件接触,因而可采用正常进给。 |
| | 被钻削的零件表面为倾斜表面,切削刃受到不均匀的负荷会使切削刃过早的磨损。如果倾斜表面的角度超过2°,进给应减小到推荐值的1/3。 |
| | 在钻入凹的表面时,通常会造成钻头偏心偏离中心,对于这种情况进给应减小到推荐值的1/3。 |
| | 在钻入不规则的表面时,由于是钻入倾斜表面,所以钻头可能会偏离中心,此时进给的选择比钻入凹表面时应更小。 |
| | 在钻入不规则表面时,会出现刀片崩刃的危险,在开始钻削时必须减小进给量,同时在钻头钻通时也可能出现这种情况,因此也必须减小进给。 |

*一般注意事项:

- 强烈推荐使用高压中心内冷方式切削,内冷切削可以最大限度的发挥钻头的切削效能,有效避免切屑的堆积、刀片的磨损以及已加工内表面的破坏,保证加工的可靠性。
- 使用外冷方式钻削,钻深不要超过1.5D;必须钻深时,推荐采用啄钻方式加工。
- 为达最佳钻削效果:
 - 检测刀柄刚性;
 - 尽量减少刀具与主轴轴线的偏差;
 - 采用推荐的切削方式;
 - 钻深2D&3D时冷却液压力最小4kg/cm²,钻深4D时冷却液压力最小5kg/cm²以上。
 - 加工孔径公差:通常情况下钻深为2D/3D时为0/+0.25;4D时为0/+0.40,但会随机床和加工条件不同而变化。
 - 避免在超过6°的斜面、中凹面、凹凸不平面上开始钻孔,这样很容易使钻头偏离中心或使钻头崩刃,如果必须这样则钻削进给量必须减小到推荐值的1/3。
 - 如果零件上已有预钻孔,则该孔的孔径不得超过成品尺寸的1/4,否则会引偏钻头。
 - 钻削有相贯孔的零件或多层叠加在一起的板材时进给量必须减小到推荐值的1/3左右。

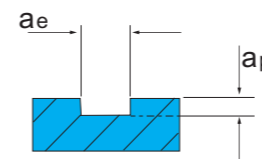
*车床使用注意事项(钻头不旋转):

- 确保刀具轴线与主轴同心度小于0.03mm,必要时需要进行适当校正。
- 钻头的安装应使周边刀片的表面平行于机床X轴的运动方向,并使周边刀片刀身靠外侧安装。
- 保证上述条件满足,沿机床X轴方向移动刀具轴线,可获得不同钻孔直径。
- 如果加工公差没有达到要求,请按上述项目逐项检查并适当调整切削参数,改善冷却条件。
- 请注意如果您的CNC车床有过换机的经历,则很难保证刀具轴线与主轴同心的要求。
- 警告:钻穿工件时,工件底面将高速飞出一团盘状废料,必须采取适当的防护措施以保证安全。

铝合金加工通用系列平底铣刀切削参数

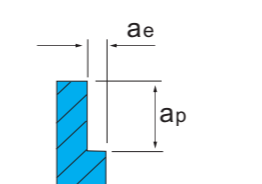
AL General Series flat-bottomed cutter cutting parameters

最大切削量



$a_p = 0.5D$

最大切削量



$a_p = 2.5D$ 以下时, $a_e = 0.1D$ 以下

- 初次使用本刀具时,进给速度依上述数据之50%试切削,切削状况稳定后再将切削速度、进给量逐一调升。请采用高精度高刚性与动态平衡最佳的夹头组,刀具偏摆精度超过0.01mm时,请改善后再切削。
- The first time using this tool, the feed rate according to the above figures of 50% of the test cutting, cutting in stable condition after the cutting speed, feed rate raised one by one. Please use the high precision and high rigidity and dynamic equilibrium better chuck groups, tool runout accuracy of better than 0.01mm, please improve after cutting.

| 被切材料 Cut material | 纯铝 1070 | 铝合金 Cu-Mg系 2014 | 铝合金 Si系 4032 | 铝合金 Mg系 5052 | 铝合金 Mg-Si系 6061 | 铝合金 Zn-Mg系 7075 | 铸造铝合金 Ac85 | | | | | | | |
|----------------------|------------|-----------------------|--------------------|--------------------|-----------------------|-----------------------|---------------|------------|-------|-------|-------|-------|-------|-------|
| 立铣刀刃径 mm | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | | | | | | |
| D3.0 | 30000 | 0.01 | 25000 | 0.01 | 2500 | 0.02 | 12000 | 0.01 | 20000 | 0.008 | 25000 | 0.008 | 15000 | 0.011 |
| D4.0 | 22000 | 0.015 | 19000 | 0.018 | 1900 | 0.036 | 9500 | 0.018 | 15000 | 0.015 | 19000 | 0.015 | 11000 | 0.018 |
| D5.0 | 18000 | 0.02 | 15000 | 0.022 | 1500 | 0.045 | 7500 | 0.022 | 12000 | 0.018 | 15000 | 0.018 | 9000 | 0.022 |
| D6.0 | 15000 | 0.022 | 13000 | 0.026 | 1300 | 0.053 | 6000 | 0.026 | 10000 | 0.021 | 13000 | 0.021 | 7500 | 0.028 |
| D8.0 | 11000 | 0.03 | 9500 | 0.035 | 950 | 0.108 | 5000 | 0.035 | 7500 | 0.028 | 9500 | 0.028 | 5500 | 0.042 |
| D10.0 | 8500 | 0.05 | 7500 | 0.054 | 750 | 0.134 | 4000 | 0.054 | 6000 | 0.044 | 7500 | 0.044 | 4500 | 0.05 |
| D12.0 | 7500 | 0.054 | 6000 | 0.065 | 600 | 0.14 | 3000 | 0.065 | 4500 | 0.052 | 6000 | 0.052 | 3500 | 0.06 |
| D16.0 | 5500 | 0.06 | 5000 | 0.07 | 500 | 0.15 | 2500 | 0.07 | 3800 | 0.06 | 5000 | 0.06 | 2800 | 0.06 |
| D20.0 | 4500 | 0.065 | 4000 | 0.08 | 400 | 0.18 | 2000 | 0.08 | 3000 | 0.06 | 4000 | 0.06 | 2500 | 0.06 |

| 被切材料 Cut material | 纯铝 1070 | 铝合金 Cu-Mg系 2014 | 铝合金 Si系 4032 | 铝合金 Mg系 5052 | 铝合金 Mg-Si系 6061 | 铝合金 Zn-Mg系 7075 | 铸造铝合金 Ac85 | | | | | | | |
|----------------------|------------|-----------------------|--------------------|--------------------|-----------------------|-----------------------|---------------|------------|-------|-------|-------|-------|-------|-------|
| 立铣刀刃径 mm | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | | | | | | |
| D3.0 | 30000 | 0.01 | 25000 | 0.01 | 2500 | 0.02 | 12000 | 0.01 | 20000 | 0.01 | 25000 | 0.01 | 15000 | 0.01 |
| D4.0 | 22000 | 0.015 | 19000 | 0.018 | 1900 | 0.036 | 9500 | 0.018 | 15000 | 0.018 | 19000 | 0.015 | 11000 | 0.015 |
| D5.0 | 18000 | 0.02 | 15000 | 0.022 | 1500 | 0.045 | 7500 | 0.022 | 12000 | 0.022 | 15000 | 0.018 | 9000 | 0.018 |
| D6.0 | 15000 | 0.022 | 13000 | 0.026 | 1300 | 0.053 | 6000 | 0.026 | 10000 | 0.026 | 13000 | 0.022 | 7500 | 0.022 |
| D8.0 | 11000 | 0.03 | 9500 | 0.035 | 950 | 0.108 | 5000 | 0.035 | 7500 | 0.035 | 9500 | 0.03 | 5500 | 0.03 |
| D10.0 | 8500 | 0.05 | 7500 | 0.054 | 750 | 0.134 | 4000 | 0.054 | 6000 | 0.054 | 7500 | 0.036 | 4500 | 0.036 |
| D12.0 | 7500 | 0.054 | 6000 | 0.065 | 600 | 0.14 | 3000 | 0.065 | 4500 | 0.065 | 6000 | 0.045 | 3500 | 0.045 |
| D16.0 | 5500 | 0.06 | 5000 | 0.07 | 500 | 0.15 | 2500 | 0.07 | 3800 | 0.07 | 5000 | 0.06 | 2800 | 0.06 |
| D20.0 | 4500 | 0.065 | 4000 | 0.08 | 400 | 0.18 | 2000 | 0.08 | 3000 | 0.08 | 4000 | 0.065 | 2500 | 0.065 |

快速钻头的推荐加工条件

Recommended cutting conditions

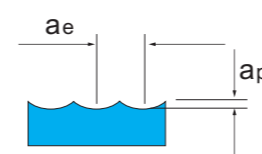
| 材料 Material | 切削速度 (m/min) Cutting speed (m/min) | 进给 (mm/rev) Feed (mm/rev) | | | | | | |
|-----------------------------------|---|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | Ø14-Ø22 | Ø23-Ø29 | Ø30-Ø36 | Ø37-Ø43 | Ø44-Ø50 | Ø51-Ø54 | Ø60-Ø70 |
| 低碳钢 (~0.3%C) Low alloy steel | 180-250 | 0.05-0.08 | 0.06-0.10 | 0.06-0.12 | 0.07-0.13 | 0.08-0.15 | 0.08-0.16 | 0.08-0.12 |
| 碳钢(0.3%C~) Carbon steel | 160-220 | 0.06-0.12 | 0.08-0.15 | 0.10-0.18 | 0.12-0.22 | 0.12-0.24 | 0.13-0.25 | 0.12-0.18 |
| 低合金钢 (~HRC32) Low carbon steel | 150-220 | 0.06-0.12 | 0.08-0.14 | 0.10-0.18 | 0.12-0.22 | 0.12-0.23 | 0.13-0.24 | 0.10-0.18 |
| 高合金钢 (HRC32~) High alloy steel | 130-180 | 0.06-0.10 | 0.08-0.15 | 0.10-0.20 | 0.12-0.23 | 0.12-0.24 | 0.13-0.25 | 0.10-0.15 |
| 不锈钢 Stainless steel | 170-240 | 0.05-0.10 | 0.06-0.12 | 0.08-0.15 | 0.09-0.16 | 0.10-0.17 | 0.11-0.19 | 0.08-0.15 |
| 铸铁 Cast Iron | 180-250 | 0.06-0.12 | 0.08-0.16 | 0.12-0.20 | 0.15-0.25 | 0.16-0.28 | 0.18-0.30 | 0.15-0.22 |
| 球墨铸件 Ductile cast Iron | 130-200 | 0.06-0.10 | 0.08-0.15 | 0.10-0.18 | 0.12-0.20 | 0.15-0.23 | 0.16-0.25 | 0.10-0.20 |
| 铝合金 Aluminium | 330-380 | 0.06-0.14 | 0.08-0.15 | 0.10-0.20 | 0.12-0.22 | 0.14-0.23 | 0.15-0.26 | 0.15-0.25 |
| 钛合金 Ti6Al | 30-60 | 0.05-0.10 | 0.06-0.14 | 0.08-0.18 | 0.11-0.22 | 0.14-0.23 | 0.15-0.24 | 0.12-0.16 |

- 初始钻削时,推荐采用中间范围切削数值,之后(根据刀具磨损情况)调整切削参数以达到最佳切削效果。
- 上述切削参数是针对2D,3D类型而言,如对4D类型的钻削参数应相应降低15%。
- 冷却方式仅采用外冷时,切削速度应降低10%。
- 对于奥氏体不锈钢加工,必需采用内冷却方式。
- 在斜面上开始钻孔或零件有预钻孔及相贯孔或钻削堆叠的多层板材时,进给量须减小到推荐值的1/3左右。

铝合金加工系列球头铣刀切削参数

AL Series of ball-end mill cutting parameters

最大切削量



$a_p = 0.1R$ 以下
 $a_e = 0.2R$ 以下

| 被切材料 Cut material | 纯铝 1070 | 铝合金 2014 | 铝合金 7075 | 纯铝 4032 | 铝合金 5052 | 铝合金 Ac85 | 纯铝 6061 | 纯铝 C1100 | | | | |
|----------------------|------------|-------------|-------------|------------|-------------|-------------|------------|-------------|-------|------|-------|------|
| 立铣刀刃径 mm | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | 转速 转/分 | 进给 mm/齿 | | | | |
| R1.0 | 50000 | 0.04 | 40000 | 0.04 | 4000 | 0.04 | 20000 | 0.04 | 32000 | 0.04 | 50000 | 0.03 |
| R2.0 | 25000 | 0.08 | 20000 | 0.08 | 2000 | 0.08 | 10000 | 0.08 | 16000 | 0.08 | 25000 | 0.06 |
| R2.5 | 20000 | 0.10 | 16000 | 0.10 | 1600 | 0.10 | 8000 | 0.10 | 12800 | 0.10 | 20000 | 0.08 |
| R3.0 | 16000 | 0.12 | 13200 | 0.12 | 1320 | 0.12 | 6600 | 0.12 | 10500 | 0.12 | 16000 | 0.10 |
| R4.0 | 12000 | 0.16 | 10000 | 0.16 | 1000 | 0.16 | 5000 | 0.16 | 8000 | 0.16 | 12000 | 0.12 |
| R5.0 | 10000 | 0.19 | 8000 | 0.19 | 800 | 0.19 | 4000 | 0.19 | 6400 | 0.19 | 10000 | 0.15 |
| R6.0 | 8000 | 0.24 | 6600 | 0.24 | 660 | 0.24 | 3300 | 0.24 | 4800 | 0.24 | 8000 | 0.18 |

- 初次使用本刀具时,进给速度依上述数据之50%试切削,切削状况稳定后再将切削速度、进给量逐一调升。请采用高精度高刚性与动态平衡最佳的夹头组,刀具偏摆精度超过0.01mm时,请改善后再切削。
- The first time using this tool, the feed rate according to the above figures of 50% of the test cutting, cutting in stable condition after the cutting speed, feed rate raised one by one. Please use the high precision and high rigidity and dynamic equilibrium better chuck groups, tool runout accuracy of better than 0.01mm, please improve after cutting.

HRC50通用系列平底铣刀切削参数

HRC50 General Series flat-bottomed cutter cutting parameters

Table with columns for material hardness (HRC30-35, HRC35-40, HRC40-45, HRC45-50) and cutting parameters (speed, feed, rpm, mm/min).

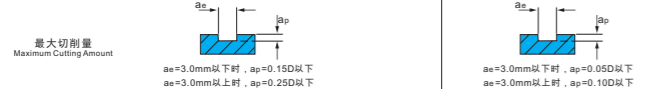


Table with columns for cutter diameter (D1.0 to D20.0) and cutting parameters (speed, feed, rpm, mm/min).

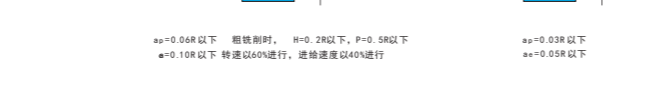
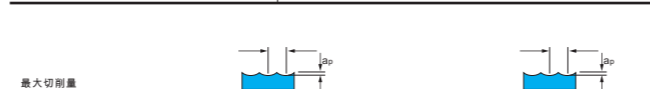


- Initial use instructions for the tool, including speed and feed rate adjustments.

HRC50通用系列球头铣刀切削参数

HRC50 General Series ball-end mill cutting parameters

Table with columns for material hardness (HRC30-35, HRC35-40, HRC40-45, HRC45-50) and cutting parameters (speed, feed, rpm, mm/min).



- Initial use instructions for the tool, including speed and feed rate adjustments.

HRC50通用系列圆鼻铣刀切削参数

HRC50 General Series Round nose cutter cutting parameters

Table with columns for material hardness (HRC30-35, HRC35-40, HRC40-45, HRC45-50) and cutting parameters (speed, feed, rpm, mm/min).

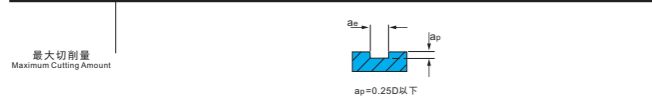
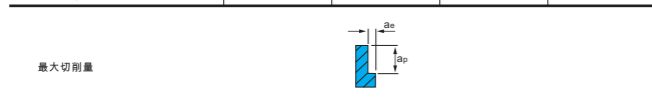


Table with columns for cutter diameter (D1.0 to D12.0) and cutting parameters (speed, feed, rpm, mm/min).



- Initial use instructions for the tool, including speed and feed rate adjustments.

HRC60系列平底铣刀切削参数

HRC60 Series of flat-bottomed cutter cutting parameters

Table with columns for material hardness (HRC30-35, HRC35-40, HRC40-50, HRC50-65) and cutting parameters (speed, feed, rpm, mm/min).

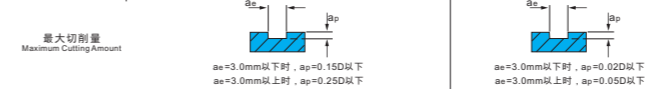
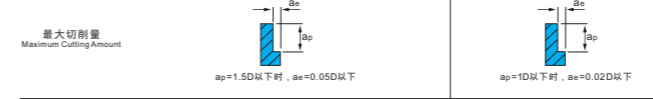


Table with columns for cutter diameter (D1.0 to D20.0) and cutting parameters (speed, feed, rpm, mm/min).



- Initial use instructions for the tool, including speed and feed rate adjustments.

HRC60系列圆鼻铣刀切削参数

HRC60 Series of round nose cutter cutting parameters

Table with columns for material hardness (HRC30-35, HRC35-40, HRC40-50, HRC50-65) and cutting parameters (speed, feed, rpm, mm/min).

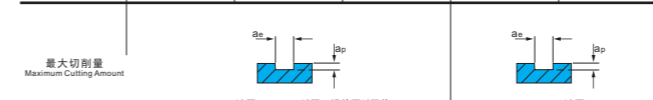
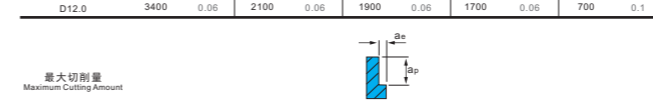


Table with columns for cutter diameter (D1.0 to D12.0) and cutting parameters (speed, feed, rpm, mm/min).



- Initial use instructions for the tool, including speed and feed rate adjustments.

铣削加工切削条件的选择方法

How to select cutting conditions for milling

Table with 4 main sections: 1. 切削速度 (Vc) Cutting Speed, 2. 进给速度 (Vf) Feed rate, 3. 加工时间 (Tc) min cutting time, 4. 切削重力 (Ne) Feed rate. Includes formulas and parameter definitions.

KS(比切削阻力) Specific cutting resistance

Table of Specific cutting resistance (KS) for various work materials and tool grades. Columns include material type, tensile strength, and KS values for different tool grades.

铣削加工时的故障及其原因、对策

Cutting condition formula (milling) and trouble shooting

Trouble shooting table with columns for Countermeasures, Tool Material, Tool Shape, and Cutting Condition. Rows describe various defects like surface wear, chipping, and thermal cracking.

超级纵横 ASJ型

Large table of recommended cutting parameters for Super ASJ type tools, including side milling and side milling data for various diameters and materials.

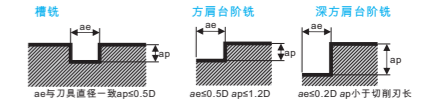
<侧铣> Side milling

Table of recommended cutting parameters for side milling operations, detailing speed, feed, and tool selection for different materials.

<钻孔加工> Drilling 务必采用分级进给。Please use only step-feed.

Table of recommended cutting parameters for drilling operations, including feed rates and speeds for various diameters.

玉米型铣削刀具 Indexable corn milling cutter



UEX标准切削条件

UEX standard cutting conditions

Table of UEX standard cutting conditions for various tool diameters and materials, providing specific speed and feed recommendations.

可转位三面刃铣削刀具

Indexable three-sided milling cutter

Table of recommended cutting parameters for indexable three-sided milling cutters, including tool grades and cutting amounts.

CBN

PCD

立装螺纹

切槽加工

通用螺纹

钻孔

通用铣削

铣削对策

粗铣加工

T型槽加工

直角台肩

快进给铣刀

圆鼻铣刀

球刀

技术资料

CBN

PCD

立装螺纹

切槽加工

通用螺纹

钻孔

通用铣削

铣削对策

粗铣加工

T型槽加工

直角台肩

快进给铣刀

圆鼻铣刀

球刀

技术资料

BAP推荐切削条件 Recommend Cutting Conditions

Table with columns: 工件材料 Cat. No., 硬度 Hardness, 刀片材料 Balde No., 加工形态, 对应断屑槽, 切削速度 (m/min), 每刃进给量 (mm/tooth). Rows include 软钢 (SS400, S10C), 碳钢, 合金钢 (S45C, SCM440), 不锈钢 (SUS304), 灰铸铁 (FCD250), 球墨铸铁 (FC450, FCD500), 铝合金, 钛合金, 耐热合金, 高硬度钢.

● 刀具转速 (min⁻¹) = (1000x切削速度) ÷ (3.14x刀具切削刃直径) ● 机床工作台进给量 (mm/min) = 每刃进给量x刀具刃数x刀具转速

超快削立铣刀 AHU型 Ultra-fast cutting milling cutter AHU type

Table with columns: 工件材料 Work, 刀片材料 Blade, 切削条件 Cutting condition, AHU/AHUM 10型, AHU/AHUB/AHUM 15型. Includes cutting speed and feed rate for various materials like 普通结构用钢, 碳素钢, 合金钢, 模具钢, 球墨铸铁, 铝合金, 钛合金, 耐热合金.

High-Feed Ultra End Mill AHU

使用SD5010铝合金和铜的切削条件 Cutting conditions for cutting aluminum alloy and copper using SD5010

Table with columns: 工件材料 Work, 切削条件 Cutting condition, AHU/AHUM 10型, AHU/AHUB/AHUM 15型. Includes cutting speed and feed rate for 铝合金 and 铜.

【注意】①这些切削条件中的数值为切削条件的基准值。实际加工时，请参考加工形状、目的、使用机床等因素，对切削条件进行调整。②Please reduce feed rate 30% from above table for starting. ③The steel chips may cause cuts, burns or damages to eyes. Be sure to install the safety goggles when using the tool and wear the safety glasses when carrying out any works.

【注意】①这些切削条件中的数值为切削条件的基准值。实际加工时，请参考加工形状、目的、使用机床等因素，对切削条件进行调整。②Please reduce feed rate 30% from above table for starting. ③The steel chips may cause cuts, burns or damages to eyes. Be sure to install the safety goggles when using the tool and wear the safety glasses when carrying out any works.

倾斜切削 Ramping

由于刃口未及中心，故倾斜角度受到限制，但若采用下图所示的倾斜切削或螺旋切削，即使无导孔，也可进行直接铣削加工。



Table with columns: 外径 Dc Tool diameter, 倾斜角 Ramp Angle, 螺旋孔径 Hole Dia. for AHU(L)/AHUM 10型 and AHU(L)/AHUM 15型.

【注意】①倾斜角α的设置不能超过上述范围。推荐在1°以下使用。②孔径超出上述范围时，请预先进行导孔加工。③The ramp angle α should be set within the ranges listed above. Use of ramp angles of 1° or less is recommended. ④For hole diameters outside the ranges listed above, a pilot hole should be drilled before milling.

T217. 69/TE90/EPX3000推荐切削条件 Recommend Cutting Conditions

Large table with columns: 工件材料 Cat. No., 硬度 Hardness, 刀片材料 Balde No., 切削速度 vc (m/min), 切削宽度 ae (mm), and various feed rates for different hole diameters (Ø12-Ø16, Ø18-Ø25, Ø28-Ø100). Rows include 软钢, 碳钢, 合金钢, 不锈钢, 灰铸铁, 球墨铸铁, 铝合金, 高硬度钢.

斜面加工, 螺旋加工条件 Bevel processing, spiral processing conditions

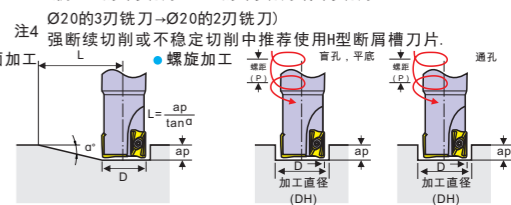
Table with columns: 刀具直径 D1 (mm), 斜面加工 (最大加工直径, 最小距离, 最大加工直径, 最大螺距), 盲孔, 平底的螺旋加工 (最大加工直径, 最小加工直径, 最大螺距, 最小加工直径).

注1 本切削条件是标准带柄型、无柄型产品的标准值。条件的设定以机床刚性及工件刚性高，不发生高频振动为前提。

注2 下面是容易产生振动的几种情况。振动发生时请降低切削深度等切削条件。

注3 刃数不同的类型时，减少刃数可以有效防止振动的发生。(例Ø25的4刃铣刀-Ø25的3刃铣刀或2刃铣刀)

注4 强断续切削或不稳定切削中推荐使用H型断屑槽刀片。



注 用上表的斜面角加工延展性大的工件材料时，切削有可能不断。这时请减小斜面角或每刃进给量。

- ① L由最大斜面角和最大切削深度10计算得出 (L=10/tan α)。② 盲孔、平底的最大加工直径是圆弧半径R=0.8的情况。其他情况请按照下式计算{(刃径)- (圆弧半径R)- 0.2} x 2

AJX 快进给铣刀 Ajx Fast Feed Milling Cutter

Table with columns for material (CBN, P, M, K, H), hardness, chip material, cutting speed, and various diameter ranges (Ø16-Ø17 to Ø80-Ø160) with sub-columns for axial and radial cutting parameters.

SKS 新干线可换刀头 SKS Shinkansen Interchangeable Cutter Head

Table for SKS interchangeable cutter head parameters, including material, chip material, and cutting conditions for diameters 16/17, 20/21/22, 25/26/28, and 32/33/35.

MSH 型可换式刀头+超强硬杆标准切削条件 MSH type replaceable cutter head + super hard rod standard cutting conditions

Table for MSH type replaceable cutter head parameters, including material, chip material, and cutting conditions for diameters 25/26/28, 30, 32/33/35, and 40.

Diagram showing different forms of processing limit (不同形态加工界限) with numbered callouts 1-9 explaining tool suspension, speed, and chip formation.

Diagram illustrating the cutting mechanism for different forms of processing limit, showing tool geometry and cutting angles.

Table for tool selection based on diameter (刀具形式, 刀片大小, 刀具直径) and cutting conditions (平面加工, 最大切削深度, 斜角加工, 螺旋孔加工, 最大钻孔深度).

Diagram and text for helical hole processing (螺旋孔加工), including formulas for tool center trajectory and cutting depth.

Diagram and text for advanced usage (高级使用方法), explaining the use of AJX tool holders and cutting depth considerations.

Table for SKS standard cutting conditions (SKS Type Standard Cutting Conditions End Milling Type) for diameters 32, 32/33/35, and 40.

Table for SKS standard cutting conditions (SKS Type Standard Cutting Conditions End Milling Type) for diameters 16/17, 20/21/22, 25/26/28, 30/32/33/35.

Table for SKS standard cutting conditions (SKS Type Standard Cutting Conditions End Milling Type) for diameters 40, 50/52, 63, 63/66, 80, 100, 125, 160.

Table for MSH type chip material selection (MSH 型刀片材质选择) showing compatibility between chip material and tool material.

Table for MSH type standard cutting conditions (MSH 型标准切削条件) for diameters 32/33, 40(柄径32), 40/44(柄径2), 50.

Table for MSH type standard cutting conditions (MSH 型标准切削条件) for diameters 40, 50/52, 63, 63/66, 80, 100, 125, 160.

高进给圆弧铣到ASR多刀型 High feed arc milling to ASR multi-blade

标准切削条件①直柄型 Standard cutting condition 1 straight shank type

Table with columns for work material (CBN, PCD, Stainless Steels, Titanium Alloys, Inconel, Aluminum Alloys, Cast Iron, Steel), tool type (End Mill, Drill, etc.), and cutting parameters (Vc, fz, ap, etc.) for various grades.

标准切削条件②硬质合金刀柄型 Standard cutting condition 2 carbide shank type

Table with columns for work material (Carbon Steels, Alloy Steels, Stainless Steels, Titanium Alloys, Inconel, Aluminum Alloys, Cast Iron, Steel), tool type (End Mill, Drill, etc.), and cutting parameters (Vc, fz, ap, etc.) for various grades.

标准切削条件③刀盘型 Recommended Cutting Conditions for Bore Type

Table with columns for work material (Carbon Steels, Alloy Steels, Stainless Steels, Titanium Alloys, Inconel, Aluminum Alloys, Cast Iron, Steel), tool type (Bore Mill), and cutting parameters (Vc, fz, ap, etc.) for various grades.

超级迷你小径铣刀ASM型 Super Mini Path Milling ASM

EDMT型刀片肩削标准切削条件: 高进给低切削 Side Milling standard cutting conditions for EDMT-type inserts: Low cutting depth, high feed rate

Table with columns for work material (Carbon Steels, Alloy Steels, Stainless Steels, Titanium Alloys, Inconel, Aluminum Alloys, Cast Iron, Steel), tool type (EDMT Insert), and cutting parameters (Vc, fz, ap, etc.) for various grades.

JDMT型刀片的肩削标准切削条件 Side Milling standards cutting conditions for JDMT-type inserts

Table with columns for work material (Carbon Steels, Alloy Steels, Stainless Steels, Titanium Alloys, Inconel, Aluminum Alloys, Cast Iron, Steel), tool type (JDMT Insert), and cutting parameters (Vc, fz, ap, etc.) for various grades.

[注意] ①根据工件材料, 加工形状, 请使用合适的冷却液。②此标准切削条件表中的数值为切削条件的基本值, 实际加工时, 请考虑加工形状, 目的, 使用机床等因素, 对切削条件进行调整。③槽切削, 倾斜切削时, 请将进给量设定为约70%。④刀片应尽早更换, 以防过度使用造成破损。⑤排出的切屑可能会四处飞溅, 割伤或烫伤操作人员, 也可能溅入眼睛而导致受伤。故在使用时应在其周围安装防护罩, 操作人员应穿戴防护镜等防护用具, 确保在安全的环境下作业。

EDMT型刀片的倾斜切削 Ramping with EDMT-type inserts

由于刃口未及中心, 故倾斜角度和孔径受到限制, 但若采用下图所示的倾斜切削或螺旋切削, 及时无导孔, 也可进行直接刻模加工。 Since the cutting flute to not extend to the center. There are limitations on the ramp angle and hole diameter. But as shown below. Processing by direct milling without a pilot hole is possible for ramping and helical milling.

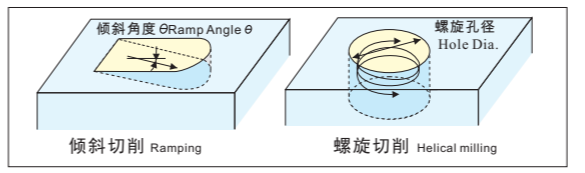


Table showing EDMT0702 parameters for different tool diameters (φ8 to φ32) including Ramp Angle and Hole Dia.

[注意] ①倾斜度θ的设定不要超出上述范围, 推荐在0.5°以下使用。②孔径超出上述范围时, 请钻孔后再进行加工。

使用刀片 Inserts

Table with columns for material (Carbon Steels, SUS, etc.), tool type (Insert), and cutting parameters (Vc, fz, ap, etc.) for various grades.

Table with columns for parts (Parts), shape (Shape), and screw driver (Screw Driver).

Table with columns for material (Material), tool type (Tool), and cutting parameters (Vc, fz, ap, etc.) for various grades.

Table with columns for tool type (Tool), material (Material), and cutting parameters (Vc, fz, ap, etc.) for various grades.

Table with columns for material (Material), tool type (Tool), and cutting parameters (Vc, fz, ap, etc.) for various grades.

EMR/EMRW EMR/EMRW round nose milling cutter

Table with columns for material (工件材料), hardness (硬度), and recommended cutting conditions (推荐切削条件) for various grades like ZP153, ZP152, ZK10.

Table showing recommended cutting depth (切削深度) in mm for different forms (R4, R5, R6, R8) and materials.



斜面加工 Bevel processing 倾斜角度和加工长度 Tilt angle and length

Large table for bevel processing parameters, including tool diameter (刀具直径), maximum bevel angle (最大倾斜角度), and maximum cutting length (最大切削长度) for various diameters (d) and materials.

螺旋孔加工 Spiral hole machining 加工孔径与切削深度的关系 Relationship between machining aperture and depth of cut

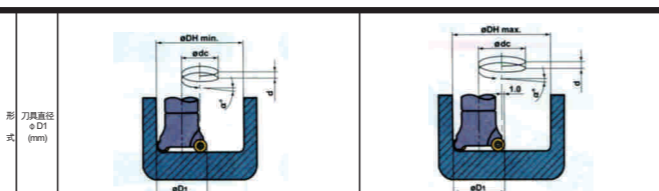


Table showing recommended cutting parameters for spiral hole machining, including tool diameter (刀具直径), cutting speed (切削速度), and feed rate (进给量) for different diameters and materials.

Notes and formulas for spiral hole machining, including DH (加工孔径), dh (刀具直径), and DH min. (最小加工直径) formulas.



TRS圆弧铣刀切削参数 TRS Arc Milling Cutter Cutting Parameters

<肩切削> Side milling

Large table for TRS arc milling cutter parameters, including material (工件材料), tool material (刀片材料), and recommended cutting conditions (推荐切削条件) for various grades and materials.

<侧铣> Side milling

Large table for side milling parameters, including material (工件材料), tool material (刀片材料), and recommended cutting conditions (推荐切削条件) for various grades and materials.

R2.5/R3/R3.5铣刀

Table for R2.5/R3/R3.5 end mills, showing recommended cutting conditions (推荐切削条件) for various materials and grades.

Table for R2.5/R3/R3.5 end mills, showing recommended cutting conditions (推荐切削条件) for various materials and grades.

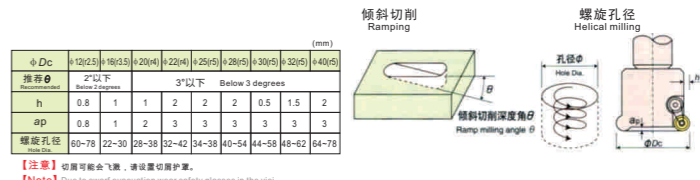
Table for groove processing (槽加工) parameters, including material (工件材料), tool material (刀片材料), and recommended cutting conditions (推荐切削条件).

Table for spiral hole machining (螺旋孔加工) parameters, including material (工件材料), tool material (刀片材料), and recommended cutting conditions (推荐切削条件).

TRSM <肩切削> Side milling

Table for TRSM side milling parameters, including material (工件材料), tool material (刀片材料), and recommended cutting conditions (推荐切削条件).

Notes for TRSM side milling, including material restrictions and recommendations for cutting conditions in different environments.



CBN, PCD, 立装螺纹, 切槽加工, 通用螺纹, 钻孔, 通用铣削, 铣削对策, 粗铣加工, T型槽加工, 直角台肩, 快进给铣刀, 圆鼻铣刀, 球刀

CBN, PCD, 立装螺纹, 切槽加工, 通用螺纹, 钻孔, 通用铣削, 铣削对策, 粗铣加工, T型槽加工, 直角台肩, 快进给铣刀, 圆鼻铣刀, 球刀

高精度球头 ABPF型 High precision ball head ABPF type

标准切削条件 Recommended cutting conditions

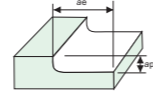


Table with columns for workpiece material, tool material, cutting conditions, and spindle speed. Includes sub-tables for CBN, PCD, and various steels.

【注意】 1. 此标准切削条件表中的数值为切削条件的基准值。实际加工时，请考虑加工形状、目的、使用机床等因素，对切削条件进行调整。

Table for adjusting cutting conditions based on overhang ratio (突出比例). Shows recommended Vc and vf for ratios < 3Dc, 3Dc-5Dc, 5Dc-8Dc, and 8Dc-10Dc.

球头铣刀 BCF型

深肩切削 Deep Side Milling

Table for deep side milling parameters including cutting speed, feed rate, and spindle speed for various materials and tool grades.

低切削深度、高速、高进给切削 Low depth of cut, High speed, High feed

Table for low depth of cut, high speed, high feed parameters, including cutting speed, feed rate, and spindle speed.

槽切削 Slotting

Table for slotting parameters including cutting speed, feed rate, and spindle speed for different materials.

肩切削 Side Milling

Table for side milling parameters including cutting speed, feed rate, and spindle speed for various materials.

【注意】 1. 此标准切削条件表中的数值为切削条件的基准值。实际加工时，请考虑加工形状、目的、使用机床等因素，对切削条件进行调整。

转速 = 500x 实际最大切削速度 / (pi x D x R x ap) 公式及说明。包括对球半径、圆周角、轴向切削量的定义。

BNM球刀推荐加工参数 BNM ball cutter recommended processing parameters

MBN/MBN-H型+超强硬杆标准切削条件 高速加工用

Table for BNM ball cutter parameters, including cutting speed, feed rate, and spindle speed for various materials and tool diameters.

MBN/MBN-H型+超强硬杆标准切削条件 一般加工用

Table for BNM ball cutter parameters for general processing, including cutting speed, feed rate, and spindle speed.

2. 螺线刀悬长, ap:切深, ae:切宽, n:主轴转速, Vf:主轴进给

Table for recommended torque values based on tool diameter and material.

CBN刀片标准切削条件

Table for CBN tool standard cutting conditions, including hardness, material, and cutting parameters.

Table for CBN tool standard cutting conditions for low speed machines, including hardness, material, and cutting parameters.

使用注意事项 1. 推荐使用高速机床，使用高速加工条件加工，如无高速机床则使用低速加工条件。

推荐切削条件 Recommended cutting conditions

Summary table of recommended cutting conditions for various workpiece materials (M, K, N) and tool materials (ZC250, ZP152, ZN60, ZC251, ZP152).

刀具转速 (min-1) = (1000x切削速度) / (3.14x刀具切削刃直径) 机床工作台进给量 (mm/min) = 每刃进给量 x 刀具刃数 x 刀具转速